

ABSTRACT OF THE DISCLOSURE

A system and method for non-destructive functional imaging and mapping of electrical excitation of biological tissues with the help of electromagnetic ("EM") field tomography and spectroscopy using a sensitive material (solution) added / injected into the biological tissue or in circulation system, characterized by having a dielectrical properties that is a function of electrical field, generated by biological tissue, plurality of EM field sources-detectors located around a biological object, so an object under a study is inside an EM field domain, and a control subsystems functionally coupled to the plurality of sources-detectors for selectively controlling function of the plurality of sources-detectors and for detected EM field from the plurality of sources-detectors so that multiple modality EM field is generated on a selected plurality of sources-detectors and detected by a selected plurality of sources-detectors after being interferenced by the object under a study and a signal inversion means operably connected to the control means for inversion of EM fields detected by a plurality of EM field detectors so an image of the object under a study and a spread of electrical excitation of biological tissue are reconstructed.